LA-UR-21-21636
Approved for public release; distribution is unlimited.

Title: Hemispherical Head RFQ Vendor Pre-proposal Meeting

Author(s): Bingham, Kelly L.
Guffee, Ray M.
Royer, Brandy Cox
Smouse, Thomas Dustin

Intended for: Presentation to be released to fabrication vendors that gives overview of LANL's vessel program and needs

Issued: 2021-02-19

Los Alamos NATIONAL LABORATORY

Hemispherical Head RFQ
Vendor Pre-proposal Meeting

Ray Guffee, Kelly Bingham, Brandy Royer, Tom Smouse

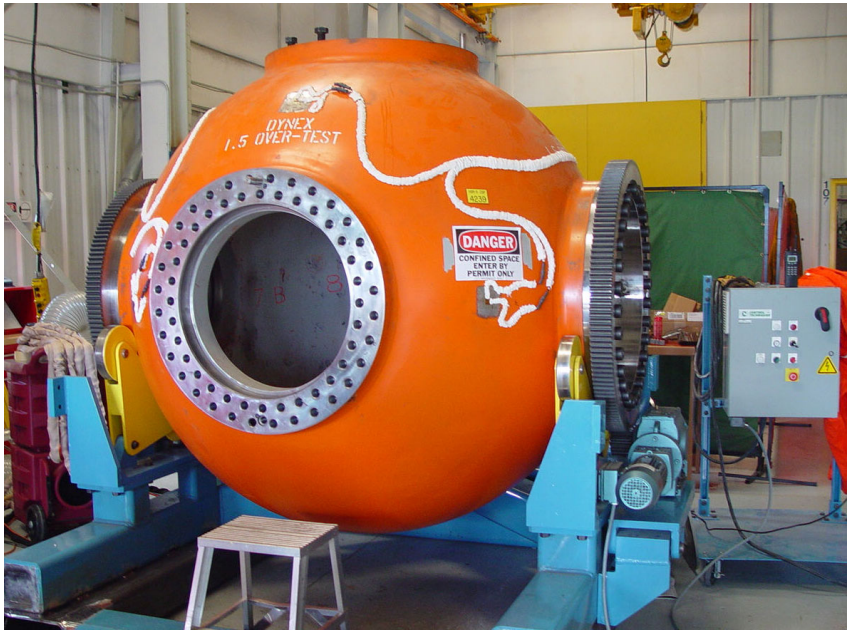
February 18, 2021

Mission Need

- LANL utilizes thick-walled, spherical vessels for numerous basic science, materials, and system performance experiments
- These pressure retaining vessels are designed and fabricated to meet the intent of ASME B&PV Section VIII, Division 3 and Code Case 2564
- LANL has successfully contracted past production of component parts (nozzle and cover forgings, plate production and head forming) and overall vessel construction (welding, inspection, hydrostatic testing) utilizing HSLA-100 steel
- As current vessel inventories approach design lifetimes, we are once again embarking upon a series of fabrication contracts to produce replacement components and vessel assemblies to ensure continued experiment cadence at LANL
- We anticipate releasing additional future vessel production contracts as experimental demands at LANL continue to increase

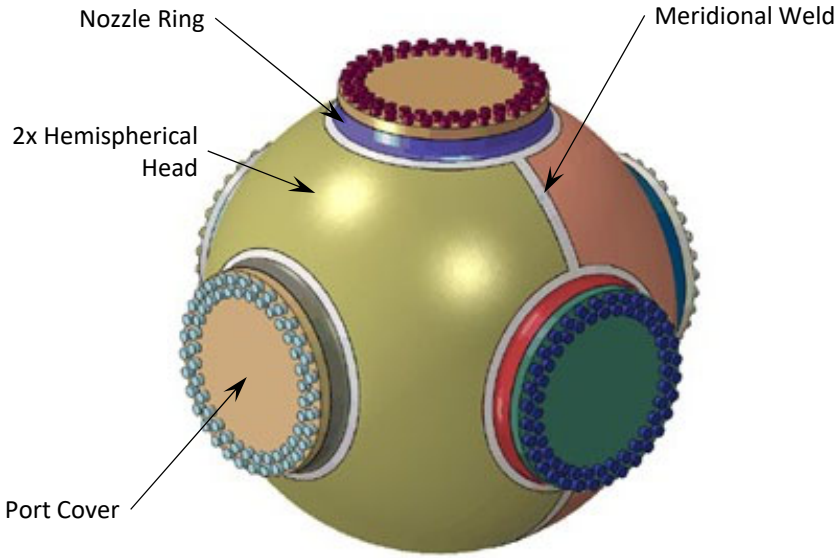
Vessels Utilized at LANL

6’ dia. – 5 port

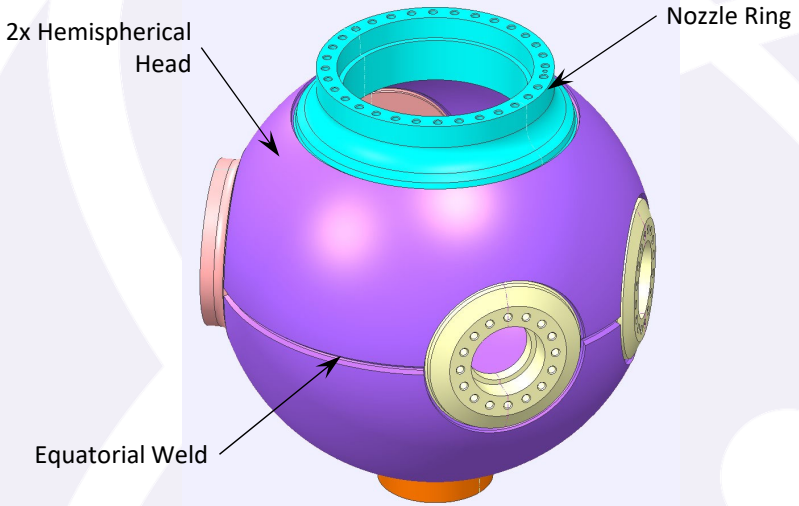


3’ dia. – 5 port

LANL Vessel Configurations



6’ x 2.5” Nom. Wall 5-Port Vessel



3’ x 1.1” Nom. Wall 5-Port Vessel

Vessel Component Parts

Hemispherical Heads
(6’ x 2.5” Nom. and 3’ x 1.1” Nom.)

Nozzle Ring Forgings
(Four Sizes Utilized)

Cover Disk Forgings
(Two Sizes Utilized)

Current Hemispherical Head Needs

Size	Quantity	Estimated Weight (lbs)
3’ dia x 1.1” Nom Wall	1 FA + 18 Production	17,100
6’ dia x 2.5” Nom Wall	1 FA + 24 Production	170,000

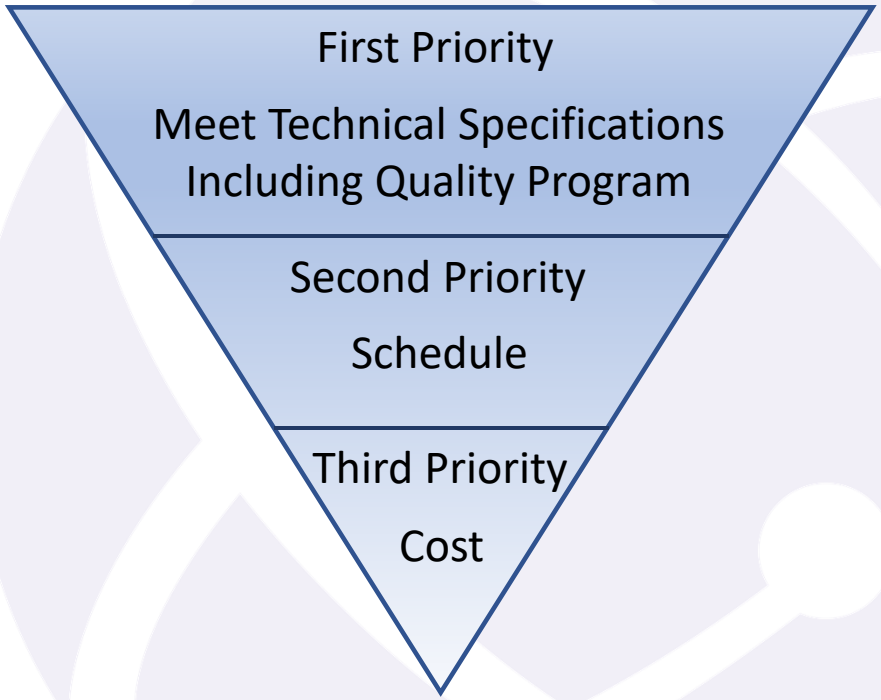
- HSLA-100 Material
  - Material of choice because of strength & toughness
  - Repairable with no post-weld Heat Treatment

Contract Overview and Structure

- At least two separate fabrication contracts will be placed, each with 2 phases
  - At least one 6’ Hemispherical Head contract
    - Phase 1 – First Article fabrication and acceptance of single representative head
    - Phase 2 – Production and acceptance of a maximum of 24 heads (final contract number contingent on technical evaluation criteria and number of Phase 2 contracts awarded)
  - At least one 3’ Hemispherical Head contract
    - Phase 1 – First Article fabrication and acceptance of single representative head
    - Phase 2 – Production and acceptance of a maximum of 18 heads (final contract number contingent on technical evaluation criteria and number of Phase 2 contracts awarded)
  - Vendor must successfully meet all First Article technical performance criteria to be eligible/qualified for Phase 2 contract awards
    - Successful 6’ Hemispherical Head First Article = Qualification for production of 6’ and 3’ heads
    - Successful 3’ Hemispherical Head First Article = Qualification for production of 3’ heads ONLY
  - Successful First Article does not guarantee award of Phase 2 contract
    - Award will be based on proposed production schedule, cost, and First Article technical performance

Qualification for Production Contract

- First Article
  - RFQ to develop your process to meet our requirements
  - Acceptable First Article technical performance
- Approved Vendor Quality Program
  - Verified during First Article phase
  - Must be established/approved prior to production award
- Award production to meet schedules
  - Production heads follow the process developed during First Article



Summary of Technical Requirements

Specified Characteristics	Requirements	Verified by
First Article	To establish means & methods of production	See items below as well as LANL Specification ENG-TS-J2-1535
Material Chemistry	Tech Pub T9704 HSLA-100 Comp 3	Chemistry & Microstructure Analysis, CMTR's
Mechanical Properties	Strength, Hardness, Ductility, Toughness	Tensile, Brinell Hardness, Charpy Impact, Charpy Transition Curves Dynamic Tear Test, & CMTR's
Soundness	Lack of voids & process defects	Wet Magnetic Particle & Ultrasonic Testing
Geometry	Fit & form must meet LANL drawing requirements	Inspection & Test Reports
Process Control	QA Program, Submittals, Travelers, Procedures, Instructions and Qualification/Certifications	Vendor QA Program Qualification, Surveillance, Inspection & Test Reports

Timeline

- Contract Introduction Meeting Feb. 18th 8:30 AM MST
- Notification of Intent to Bid due Feb. 25th 2021
- Proposals due March 5, 2021
- Intent to award by end of March

Questions and Contacts

- Contract Questions:
  - Letitia Espinosa
  - lme@lanl.gov
  - 505 695 6209 Cell
  - 505 606 1606 Work

- Technical Questions
  - Ray Guffee
  - guffee@lanl.gov
  - 505 667 1374 Work

- QA Questions:
  - Kelly Bingham
  - kellyb@lanl.gov
  - 505 620-9628 Cell

Backup Slides

Current Vessel & Component Needs

Current 6' Vessel Component Needs							
Vessels Needed					12	By	Mar. - 22
Description	**Qty/vessel**	**Part Size**	**lbs/ piece**	**lbs / vessel**	**Qty PO**	**Weight PO**	**Tons PO**
HSLA-100 Hemi-Heads	2	2.625" x 72" id.	6,800	13,600	25	170,000	85
HSLA-100 Nozzle	5	37.7" od x 23.2" id x 6.9"	1,400	7,000	60	84,000	42
HSLA-100 Cover Disks	5	34.7" od x 6.5"	1,800	9,000	70	126,000	63
Weld Metal lbs	916	Double U Joint Weld Filler	916	916	10,997	10,997	5.5
		Total weight/ Vessel		**30,516**	**Weight/ PO**	390,997	195.50

Current 3' Vessel & Component Needs							
Vessels Needed					9	By	Dec. -22
Description	**Qty/Vessel**	**Part Size**	**lbs/ piece**	**lbs / vessel**	**Qty PO**	**Weight PO**	**Tons PO**
HSLA-100 Hemi-Heads	2	1.25" x 36" dia.	900	1,800	19	17,100	8.55
HSLA-100 Top Nozzle	1	25" od x 15.5" id x 6.4"	600	600	10	6,000	3.00
HSLA-100 Top Cover	1	22" od x 6"	540	540	9	4,860	2.43
HSLA-100 Enter Nozzle	2	17.1" od x 5.2" id x 3.8	300	600	18	5,400	2.70
HSLA-100 Exit Nozzle	2	16.5" od x 9.48" id x 3.30"	280	560	18	5,040	2.52
HSLA-100 Base Ring	1	11" od x 5.4" id x 4"	126	126	9	1,134	0.57
Weld Metal lbs	121	Double U Joint Weld Filler	121	121	1,089	1,089	0.54
		Weight/Vessel		2,547	**Weight/ PO**	23,523	11.76

Future Vessel & Components Needs

Future 6' Vessel Needs							
Additional 6' Vessels Needed					6	By	Mar. - 25
Vessel Components							
Description	Qty/vessel	Part Size	lbs/ piece	bs / vesse	Qty	Weight	Tons
HSLA-100 Hemi-Heads	2	2.625" x 72" id.	6,800	13,600	13	88,400	44.2
HSLA-100 Nozzle	5	37.7" od x 23.2" id x 6.9"	1,400	7,000	32	44,800	22.4
HSLA-100 Cover Disks	5	34.7" od x 6.5"	1,800	9,000	32	57,600	28.8
Weld Metal lbs	916	Double U Joint Weld Filler		916	12	10,997	0.0
		Total weight/ Vessel		**30,516**	**Weight**	201,797	95.41

Future 3' Vessel Needs							
Additional 3' Vessels					9	By	Dec. -25
Vessel Components Needed							
Description	Qty/Vessel	Part Size	lbs/ piece	bs / vesse	Qty	Weight	Tons
HSLA-100 Hemi-Heads	2	1.25" x 36" dia.	900	1,800	19	17,100	8.55
HSLA-100 Top Nozzle	1	25" od x 15.5" id x 6.4"	600	600	10	6,000	3.00
HSLA-100 Top Cover	1	22" od x 6"	540	540	9	4,860	2.43
HSLA-100 Enter Nozzle	2	17.1" od x 5.2" id x 3.8	300	600	18	5,400	2.70
HSLA-100 Exit Nozzle	2	16.5" od x 9.48" id x 3.30"	280	560	18	5,040	2.52
HSLA-100 Base Ring	1	11" od x 5.4" id x 4"	40	40	9	360	0.18
Weld Metal lbs	121	Double U Joint Weld Filler		121	1,089	1,089	0.54
		Weight/Vessel		2,461	**Weight**	22,749	11.37